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Geographically differentiated pay in the labour market for nurses

Robert F. Elliott[1,2,3], Ada Ma[1], Anthony Scott[2,3], David Bell[4]and Elizabeth Roberts[4]

Abstract

The flexibility of health care employers in setting pay and conditions is key in being able to compete effectively in the labour market. This is particularly the case for nurses in the UK, where the government has set ambitious recruitment targets, and where shortages persist in many geographical areas. The aim of this paper is to explore the effect of relative rates of pay on vacancy rates for nurses in different local labour markets. Differences in the level of remuneration are estimated using standardised spatial wage differentials (SSWDs) across English health authorities using the Quarterly Labour Force Survey for 2000. These enable us to control for differences in the human capital composition of the workforce in different areas. The effect of these on NHS nursing vacancies is then explored. The pay of female NHS nurses is compared to a comparator group of female private sector workers, where these occupations contain individuals with nursing qualifications. Preliminary results suggest that wage differentials do influence vacancy rates in health authorities: health authorities where NHS nurses wages are higher than comparable private sector wages have lower vacancy rates. Further research will examine the effect of differentials between non-pecuniary job characteristics within health authorities on vacancy rates.

1. Department of Economics, University of Aberdeen
2. Centre for European Labour Market Research, University of Aberdeen.
3. Health Economics Research Unit, University of Aberdeen
4. Department of Economics, University of Stirling

Correspondence to:
Anthony Scott, Health Economics Research Unit, Institute of Applied Health Sciences, University of Aberdeen, Foresterhill, Aberdeen, AB25 9ZD. Tel: +44 (0)1224 553862; Fax: +44 (0)1224 550926 ; a.scott@abdn.ac.uk.

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Introduction

Health services need to have adequate numbers of motivated staff to deliver efficient health care. Workforce issues have now become a key policy area in a number of countries. An important issue in both recruitment and retention and in motivating staff is the role of pay.[1] In his Budget statement in April 2003 the Chancellor of the Exchequer proposed to introduce "measures to ensure that public service pay systems are more responsive to regional labour market conditions. "(HM Treasury, 2003)

In the UK National Health Service pay is negotiated at national level between the main professions and government, via the statutatory 'Review Bodies' for the two key NHS staff groups, doctors and nurses (Review Body on Doctors and Dentists Remuneration, 2002; Review Body for Nursing Staff, Midwives and Professions Allied to Medicine, 2002; Incomes Data Services, 2003). The review bodies gather evidence from the Departments of Health in England, Wales, Scotland and Northern Ireland, and also from professional bodies such as the British Medial Association and Royal College of Nurses. The relevant Review Body then recommends to Ministers any changes in the level of pay and conditions of service based on the evidence submitted. Each staff group uses a common national salary scale and the same terms and conditions apply across the UK.[2]

Within this centralised pay setting framework, it would be expected that NHS employers, such as NHS Hospital Trusts, have little scope to be flexible and to respond to changes in local labour market conditions by geographically differentiating pay. In practice, NHS employers may have some flexibility to appoint at different levels on pay scales, but the centralised pay setting arrangements and the requirement to stay within budget prevents widespread use of pay as an instrument to address staff shortages. For hospital medical and nursing staff geographic pay differentiation is confined to additional allowances for those in London (medical staff) or London and contiguous areas (nursing staff) to compensate for the high cost of living (London Weighting Advisory Panel, 2002).

There may also be some scope in the nursing grades for allocating auxiliary nurses to either the B or C grades and qualified nurses to either the D or E grades. In either case this could make a

[1] Although recent evidence suggests that other non-pecuniary factors may play a major role, it is important to investigate the potential role of pay as a policy instrument

[2] There may be some differences in pay and conditions across the territories of the UK in the new contracts for hospital consultants, to be introduced in 2004.

difference of about £1,000 p.a. Beyond these two examples the grading structure does not appear to offer much scope for using geographically differentiate rewards. As to whether or not this happens the Review Body provides no evidence. The 2002 Review Body for Nursing Staff records that both the Scottish Executive and National Assembly for Wales emphasised the weaker financial situation in their countries and while the Scottish submission emphasised the better recruitment and retention in this country, both submissions suggested that the pay awards should be designed to reflect their specific circumstances and plans for the NHS.

NHS employers are more likely to alter the non-pecuniary benefits, such as the quality of the working environment, training and relocation expenses. Employers also participate in national initiatives, such as 'return to practice' schemes, which offer additional funding for re-training and recruitment for staff who have been out of the workforce for some time (Elliott et al., 2003). However, the persistence of nursing vacancies in some geographical areas and in some specialities suggests that these policies are having little effect and that more needs to be done to address these shortages.

New national contracts for doctors, nurses and other NHS staff, which are to be introduced in 2004, will introduce some local flexibility in terms of local recruitment and retention premia but a more rigorous job evaluation scheme for non-medical staff is likely to reduce the ability of employers to be flexible (Health Departments of Great Britain, 2003)).

The aim of this paper is to explore the effect of relative rates of pay on vacancy rates for nurses in different local labour markets. The main hypothesis is that the level of vacancies in the NHS is determined by differences between the level of remuneration for NHS nurses and the level of remuneration in other occupations that are similar in terms of skills required, the level of non-pecuniary rewards and working conditions. Differences in the level of remuneration are estimated using standardised spatial wage differentials (SSWDs) across geographical areas of Great Britain using the Quarterly Labour Force Survey. These enable us to control for differences in the human capital composition of the workforce in different areas. The effect of these on NHS nursing vacancies is then explored.

Geographical differentiation of pay

Competition in labour markets ensures that the net advantages of different jobs will tend to equality (Smith, 1776). We expect to find higher pay in some areas of the country to compensate for the higher cost of living and the less pleasant working environment. Differences in the average levels of pay between different areas of the country can be explained by two groups of factors: first differences in the productive characteristics of the workforce in different areas and second differences in jobs and the structure of pecuniary and non-pecuniary rewards. In order to capture this first group we are required to measure differences in human capital. This second group requires us to measure differences in the characteristics of the jobs and in the structure of non-pay pecuniary rewards and other non-monetary rewards from work (Rosen, 1986).

Empirical research has provided support for this theory of geographical pay differences. Differences between geographical areas in the human capital of the workforce, (Reilly, 1992) in the working environment, as proxied by the industrial mix, (Shah and Walker, 1983) and in the attractiveness of the external environment in which they live and work (Blackaby and Murphy 1995), have all been found to be important in explaining the pattern of geographical pay differences in the UK.

Estimates of SSWDs have been produced for the UK by Blanchflower et.al (1996), as reported in Elliott, McDonald and McIver (1996), and by Wilson et al (1996). Using standard regression models to control for all the measured differences in the characteristics of the workforce and jobs in different areas, they have estimated SSWDs for the public and private sectors. They reveal that a significant part of the differences in 'raw' or unadjusted differences in average pay levels between areas can be explained by the measured characteristics. These studies reveal substantial variation in the size of the SSWDs in different areas.

For the net advantages of jobs in different areas to be equalised labour must be mobile, labour markets must be integrated, and pay structures flexible. Where these are not present departures from equilibrium will occur. Researchers have pointed to differences in geographical unemployment rates - strictly these must be differences in unemployment rates beyond the area natural rates, though these have not been estimated - as evidence of temporary disequilibrium. Such differences in the unemployment rates between areas feed back into and affect pay. Empirical evidence of a negative relationship between the levels of local pay and unemployment has been advanced to support the existence of a wage curve (Blanchflower and

Oswald, 1994). Though the existence of the wage curve has been contested (see Card, 1995, Blanchard and Katz, 1997, and Black and Fitzroy, 2000) few researchers now dispute that in some way unemployment affects pay.

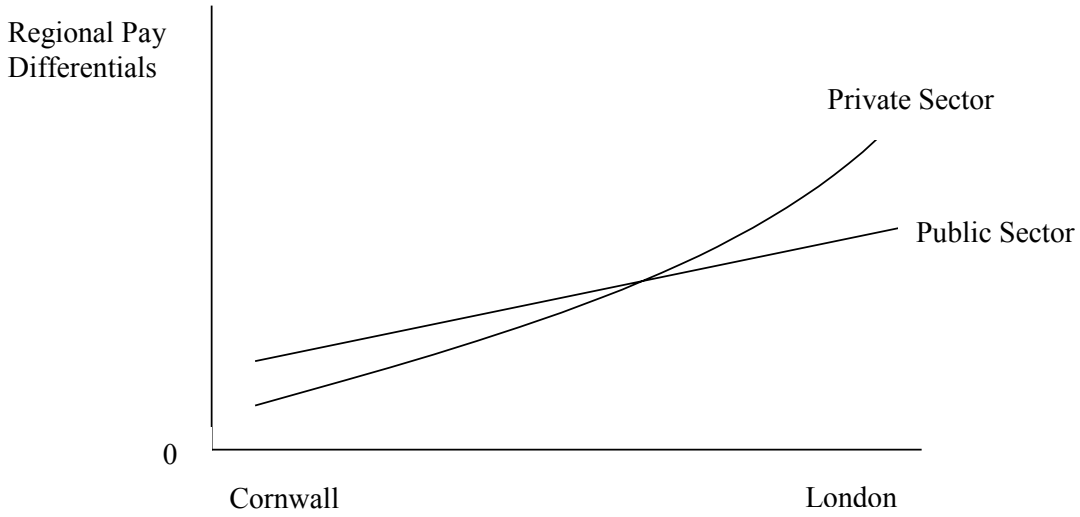
Disequilibria in labour markets may also result from inflexible wage structures. These structures reflect the preferences of those participating in the institutions that set pay. Where trade unions have an important role in pay setting, pay is likely to deviate from the rates that would be otherwise be paid in the market.[3] Trade unions are likely to be concerned about equity and fair pay, and often seek to negotiate a national rate for the job (see Metcalf et. al. 2001). Where this happens they will narrow the distribution of pay and the resulting wage structure will be flatter than would otherwise occur. The incidence of trade unionism is much greater in the public sector than in the private sector. It therefore seems likely that the geographical pattern of pay in the public sector will reveal a much flatter pay structure than in the private sector. Thus even though average pay may be the same in the two sectors, where the private sector exhibits a much steeper profile, as illustrated in Figure 1 below below, the public sector will overpay in the low cost high amenity area and underpay in the high cost low amenity area. This pattern would be expected for nurses working in the NHS as they are paid on national salary scales delivering common rates of pay. In contrast other private sector occupations in which nurses could potentially work are likely to reveal much greater spatial distribution of pay.

Empirical Model

The model we estimate examines the effect of the SSWDs on nursing vacancy rates. Vacancy rates represent disequilibrium in the nursing labour market. The rate of vacancies for NHS nurses (vacant posts as a proportion of total staff establishment) that remain unfilled in Health Authority i (V_i) is determined by the differential (D_i) between wages in this occupation compared to wages in occupations that are similar in terms of skills required, level of pecuniary rewards and working conditions in Health Authority i. D_i is the standardised spatial wage differential.

Figure 1. Geographical differences in pay between the public and private sectors

[3] If the power of trade unions differs between areas (see Blackaby and Manning, 1991) this will affect geographical patterns of pay.



Vacancy rates will also be determined by differences in the non-pecuniary aspects of jobs within each health authority. However, this preliminary analysis will focus on SSWDs due to the small sample size. We therefore assume that differences in non-pecuniary factors are captured in the error term and are not correlated with D_i. The equation we estimate is :

$$\ln V_i = \alpha + \beta D_i + \varepsilon \qquad (1)$$

Vacancy rates are non-negative and we must therefore take the natural log of this variable. The first term on the right hand side, α, is an intercept as well as the natural vacancy rate due to turnover. β is the coefficient that captures the effect of the wage differential on vacancy rates. Where NHS nurses have higher wages than the comparator occupation, then NHS nursing vacancies will be lower. *Di* is therefore expected to be negative. The error term reflects unobserved factors that influence NHS nursing vacancy rates in each health authority that are uncorrelated with D_i.

A key issue is the estimation of D_i, the standardised spatial wage differential. These are based on the estimation of two linear wage equations, one for NHS nurses (denoted *N*) and one for those in the comparative group (denoted *C*). The natural logs of individuals' hourly wages are determined by their human capital, **H**; job characteristics, **J**, and; *i* health authority area dummy variables, **A**:

$$\ln w_N = \alpha_N + \beta_{1N} \quad _N + \beta_{2N} \quad _N + \beta_{3N} \quad _N \qquad (2)$$

$$\ln w_C = \alpha_C + \beta_{1C} \quad _C + \beta_{2C} \quad _C + \beta_{3C} \quad _C \qquad (3)$$

It is the differences between β_{3N} and β_{3C} for each health authority that form D_i in equation 1. This is equivalent to running a single estimation with the original explanatory variables plus a nurse dummy variable which equals to one for NHS nurses (N), and interaction terms created by multiplying this dummy variable with each of the original explanatory variables, including the health authority dummy variables. The equation we shall estimate pooling data for both NHS nurses and for their comparator groups is therefore:

$$\ln w_{NC} = \alpha + \beta_1 \quad + \beta_2 \quad + \beta_3 \quad + \beta \; N + \beta_5 \quad N + \beta_6 \; N + \beta_7 \quad N \qquad (4)$$

The estimated coefficient of the NHS nurse dummy variable (β_4) measures how differently NHS nurses are rewarded on average. The estimated coefficients of the interaction terms measure how differently nurses are rewarded for their human capital (β_5), for the characteristics of their job (β_6), and for working within a certain health authority area (β_7), relative to individuals in the comparator group. β_7 represent the vector of coefficients for each health authority (D_i) that will be included as regressors in equation (1), and that represent the standardised spatial wage differential for each health authority.

Data

The data on vacancy rates for NHS nurses are obtained from the websites of the English Department of Health. The figures reported are three-month vacancies: posts which had remained vacant for at least three months and where the health authorities were actively seeking to fill, as at 31st March 2000.[4]

For data on individual level wages and other attributes of individuals, we used the Quarterly Labour Force Survey (QLFS). Data on pay has been collected since 1992. The QLFS is conducted by interviewing residents in private households in the UK from a random sample of postal addresses. Each household is interviewed five times (five waves) at three monthly intervals (four quarters). In every quarter, 20% of the sample is new (who have their first interview) and 20% of the sample have their last interview. Around 15,000 households are interviewed in each wave providing data for around 11,000 employees. This produces a sample

[4] We intend to extent the analysis to Scotland and Wales.

of approximately 120,000 people aged 16 or over in around 61,000 households per quarter. Data are collected on earnings, working hours, education, household composition and household and individual characteristics. We pool data from waves 1 and 5 (where data on pay is collected) from 4 successive quarters: March to May 2000, June to August 2000, September to November 2000, and December 2000 to January 2001.

To match the areas from the LFS to health authority areas, observations of individuals in the LFS within each local authority district (LAD) are mapped into the boundaries of the 99 English health authoritiess. Health authorities are larger geographical areas than LADs, and so there is at least one LAD in each health authority area. At the moment we have the identifiers for LADs for 2000 only. The exact matching of the two is derived from an annual publication by the National Statistics called *NHS Organisational Manual*.[5]

NHS nurses are defined as nurses, midwives, and assistant/auxilliary nurses employed in a health authority or NHS Trust. Only those NHS nurses who answered questions on pay are included. A key issue is the definition of 'comparator' occupations for NHS nurses. It is important to select those occupations that compete with the NHS in terms of requiring staff with similar skills and education levels. We therefore selected those occupations in the private sector chosen by female workers who have nursing qualifications (including private sector nurses). All female workers from these occupations were chosen as comparators rather than just the wages of those with nursing qualifications, as it will be the average wages in each occupational group that is likely to attract staff.

Females were chosen because the majority of NHS nurses are female and in other occupations women may be paid less than males. Including male wages may therefore overestimate the wage differential. Those working in the private sector were selected as this is where employers have more flexibility in setting pay, and therefore where wage-based competition with the NHS is most likely to exist.

The questions on pay refer to the last payment the subject receives and the questions on work hours refer to the week before the interview took place. The dependent variable is the natural log of the respondent's gross weekly pay divided by their basic hours of work plus their paid

[5] The current edition is downloadable from the website of National Statistics (http://www.statistics.gov.uk).

overtime hours where these latter are multiplied by 1.3 to reflect higher pay for these hours (Hart and Ruffell, 1996).

The wage equations include standard human capital variables such as education and experience. Highest educational attainment is included as four categories including no qualifications/CSE or below; GCSE A-C equivalent; A-level or equivalent, and; a degree or higher. There is also a dummy variable if an individual holds any kind of nursing qualification. Tenure (and tenure squared) is the length of time in their current job which will influence nurses wages due to the inceremental salary scale, and age and age squared will also proxy experience and seniority[6]. Personal characteristics include marital status and ethnic origin.

In a competitive labour market the market wage also reflects the relative advantages and disadvantages of jobs. In nursing, a key variable that has been shown to influence labour supply is shift working (Askildsen et al., 2003). However, this is only collected in the spring quarter, so instead we use variables that capture the time of day that is usually worked (daytime, evenings and nights), and also the number of days per week worked that will reflect weekend working (collected during spring and autumn quarters). Other job characteristics include whether the job is permanent, full time, and whether the job is managerial, supervisory or non-supervisory (proxies for grade and seniority).

Results

Table 1 shows the descriptive statistics for the sample used in the regressions, which includes 709 NHS nurses and 9,156 individuals in the comparator group. Compared to the comparator group, NHS nurses are on average older, and more likely to be non-white, single, and have a degree. They are more likely to have a higher hourly wage. Nurses are also more likely to have managerial and supervisory roles relative to the comparator group. Nurses are more likely to work more days per week, to work during the evening and night, to work full time, and to have spent more time in their current job.

The results from the wage equations are shown in Table 2. Health authority dummies have been suppressed, but are available from the authors. Not surprisingly, there are few statistically

[6] Although these will be measured with error due to the discontinuous nature of employment for women. Age is a poorer proxy fro experience for women that it for men.

significant variables that explain wages for NHS nurses.[7] However, tenure and tenure squared are statistically significant and nurses in supervisory and managerial roles receive higher pay compared to those in non-managerial/supervisory roles. Other variables significant at the 10% level include those whose highest qualification is a degree and those who have a permanent job, although this group receives lower wages compared to those with temporary jobs.

The insignificance of other variables could reflect a small sample size but are more likely to reflect the fact that there are no returns to ethnicity, time of day worked, or the length of the working week. Other wage equations for NHS nurses using the LFS have many more statistically significant variables, including the standard human capital variables, although they have used much larger geographical areas and also used larger sample sizes (Skatun et al., 2003; Frijters et al., 2003).

The suppressed health authority dummies in the NHS nurses wage equation are not individually significant. It is likely that this reflects the centralised bargaining of wages for NHS nurses, that produces little variation across health authorities. We would also expect few returns to educational qualifications and experience due to the rigid structure of promotion.

In contrast, most variables in the comparator model are statistically significant and of the correct sign. The only exceptions are evening and night-time working where wages are lower compared to those who usually work during the day. All human capital variables are of the correct sign and statistically significant. Lower returns are offered for working during the evening and night, and for those working at weekends. There are higher returns for being in a managerial role, although being in a supervisory role does not offer higher returns. Those whose capacity to work is limited by illness receive lower wages, and those whose job is permanent and full time receive higher wages. The health authority dummies are also statistically significant in this model, suggesting that there is much more geographical differentiation of pay in the private sector, as we would have expected.

The model with the full sample in the last column of Table 2 shows the interaction terms between each variable and being an NHS nurse: the difference in returns from being an NHS nurse compared to a private sector female. NHS receive lower returns than the comparator

[7] Where we focus on the wages of a single occupation whose pay is set by an administrative process, we should not expect the standard variables to be significant.

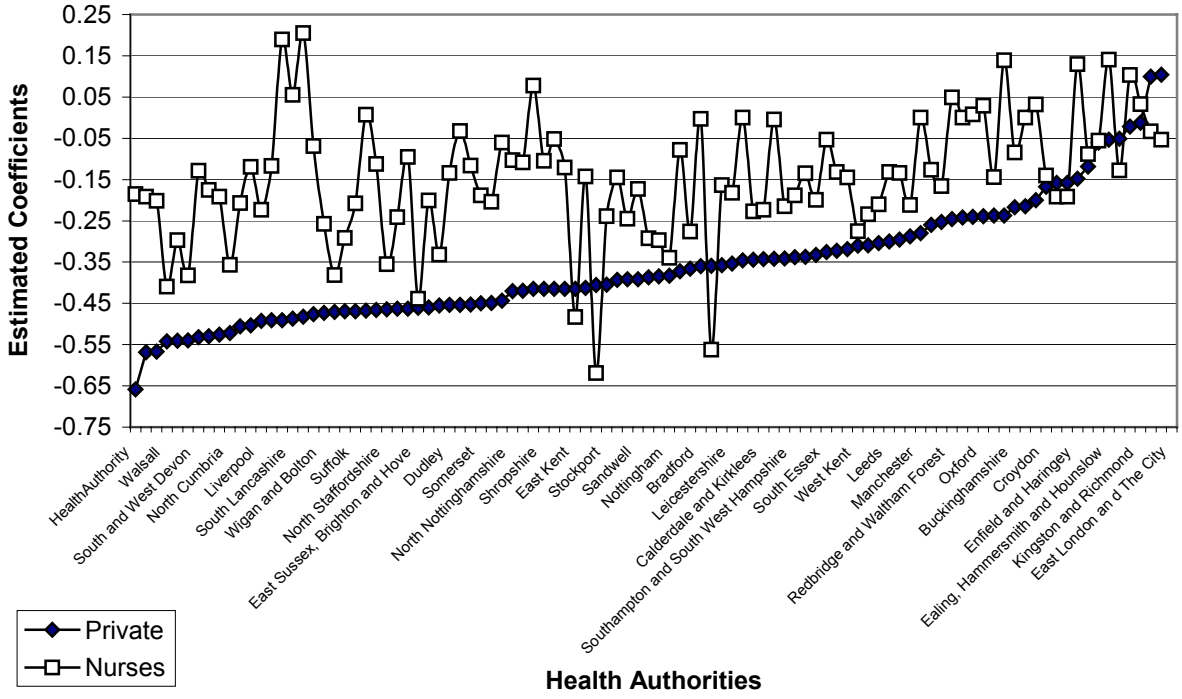
group from being older and from having A-levels. NHS nurses receive higher returns if they usually work during the night, but receive lower wages if they are in a managerial role relative to those in the comparator group. NHS nurses also receive lower returns if they have a permanent job and if they work full time compared to their counterparts in the comparator group.

The interaction terms between the health authority dummies and being an NHS nurse are not statistically significant (not shown in the table). This reflects the fact that wage differentials within each health authority are not different from zero. This simply reflects the insignificance of the health authority dummies in the NHS nurses model. On average, however, NHS nurses wages are higher than in the comparator group.

Figure 2 plots the regression coefficients (SSWDs) of the health authority dummy variables for NHS nurses and the comparator group. The left of the graph shows the high amenity low cost areas and the right of the graph shows health authorities in the south-east, the low amenity and high cost areas. Although there is much variation in the NHS nurses' coefficients, this is due to the relatively small sample size. These coefficients are not significantly different from zero. However, the line appears flatter compared to the comparator group, although there is a slight increase in wages for the London health authorities to the right of the graph. This reflects the London allowances paid to NHS nurses that provide some compensation for working in a high cost health authority area. Geographical differences in pay in the comparator group are much more pronounced.

Our main interest, however, is the effect of wage differentials across health authorities on the vacancy rates for each health authority. Table 3 summarises the descriptive statistics for vacancy rates and for the SSWDs (D_i). Table 4 presents the results of this simple regression model, with D_i having the expected negative sign: where nurses wages are higher than the comparator group the vacancy rate in the health authority is lower. This suggests that wage differentials in local labour markets do influence NHS vacancy rates. However, this initial and simple model may be misspecified as we can also hypothesise that differences in other non-pecuniary job characteristics between NHS nurses and the comparator group within health authorities will also influence vacancy rates. However, at the moment our sample size is too small to estimate these other variables and so this is a topic for further research.

Figure 2. Geographical variation in wages for NHS nurses and the comparator group.



Discussion

The role of pecuniary and non-pecuniary factors in labour supply decisions is a key issue in devising policies to influence recruitment and retention in nursing. A key role is played by alternative employment opportunities in local labour markets. Previous studies of labour supply decisions have not examined the issue of local labour markets in detail. Local NHS employers need to be able to alter pecuniary and non-pecuniary rewards to be able to compete with other employees who require similar skills and training. The aim of this paper has been to present some preliminary results that examine the relationship between the relative pay of NHS nurses and comparator occupations, and NHS vacancy rates in health authorities. Initial results show that disequilibrium in the labour market for nurses is influenced by wage differentials.

However, these results are preliminary. Our sample size is restricted due to the availability of LAD codes for only 2000. Thus we cannot map individuals in the LFS to health authorities for other years. This means that we cannot, at this stage, estimate differentials for other job characteristics that may also influence NHS nursing vacancies. There may also be other characteristics of health authorities that influence vacancies, such as the characteristics of the

working population, and the characteristics of the NHS, such as whether there is a teaching hospital in the health authority that may making working there more attractive. Further work will seek to obtain these data.

A further issue is that we have restricted the model so that competition occurs within a given geographical area. Though the appropriate labour market for nurses is likely to be a small geographical area, it is still likely that health authorities also compete for nurses with other geographical areas, particularly neighbouring geographical areas (Elliott et al., 2003). This will be accounted for in further work by including a weighted wage differential that reflects relative wages in adjoining health authority areas.

The choice of the comparator group is also important. Other studies of nurses have used different comparators. Morris (2002) used other non-manual workers within the LFS, although this may be too broad. Frijters et al. (2003) used the wages of NHS nurses who had recently left the NHS. Both of these studies have found that NHS nurses wages are higher than comparator groups, whilst controlling for other factors that influence wages. The data in this study also shows this, although the size of these estimates vary. Further research will use different comparator groups to test the sensitivity of the wage differentials to the choice of comparator group.

Although it is too early in this research to make policy recommendations, altering the pecuniary and non-pecuniary rewards offered by the NHS may help to reduce vacancy rates in the NHS. Although pay matters, previous research in the UK and in Norway suggests its effect on labour supply decisions is likely to be small (Skatun et al., 2001; Frijters et al., 2003; Askildsen et al., 2003; Shields and Ward, 2001). There is little scope for NHS employers to alter pay given the current pay setting arrangements, and new contracts for non-medical staff are likely to eliminate any scope that did exist (Agenda for Change). Changing the non-pecuniary job characteristics should be the main focus of further research.

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Table 1. Summary Statistics

	Nurses: 7.24% of the sample 709 Observations		Comparators: 92.76% of the sample 9156 Observations		Full Sample, 9865 Observations	
	Mean	SD	Mean	SD	Mean	SD
Age	41.5035	9.6405	38.6671	12.6782	38.8710	12.5056
Age Square / 100	18.1535	8.2429	16.5586	10.1619	16.67326	10.04433
Tenure	11.5228	8.8456	6.0039	6.6691	6.4005	6.9949
Tenure Square / 100	2.1091	2.6832	0.8052	1.7167	0.8989	1.8345
Length of Work Week (1-7)	4.3738	1.3644	4.3356	1.3234	4.3384	1.3263
Ln(Hourly Wage)	2.1333	0.3816	1.6681	0.5068	1.7016	0.5131
Non-White	0.0494		0.348		0.359	
White	0.9506		0.9652		0.9641	
Singe, Never married	0.1467		0.2805		0.2709	
Married, living together	0.6897		0.5629		0.5720	
Separated/Divorced/Widowed	0.1636		0.1566		0.1571	
CSE or below (No Qual)	0.916		0.3525		0.3337	
GCSE	0.917		0.3818		0.3610	
A-Level	0.494		0.1946		0.1842	
Degree	0.7673		0.711		0.1211	
Any nursing qualification	0.7532		0.244		0.767	
Capacity to Work Limited by Health	0.748		0.733		0.734	
Usually work during Day	0.3075		0.7485		0.7168	
Usually work during Evening	0.2073		0.1796		0.1816	
Usually work during Night	0.4852		0.719		0.1016	
Job is Permanent	0.9520		0.9593		0.9587	
Full-Time Employees	0.5374		0.4842		0.4880	
Managers	0.4203		0.1168		0.1386	
Foreman / Supervisors	0.1622		0.1264		0.1289	

Table 2. Wage equations (coefficients of Health Authority dummies are suppressed.

	[1] Nurses			[2] Comparators			[3] Pooled: only results of interaction terms are shown		
	Coeff.	**t**	**P>|t|**	**Coeff.**	**t**	**P>|t|**	**Coeff.**	**t**	**P>|t|**
Married	-0.0216	-0.5000	0.6150	0.0481	3.3000	0.0010	-0.0697	-1.1900	0.2330
Separated/Divorced/Widowed	-0.0072	-0.1400	0.8910	0.0158	0.8900	0.3730	-0.0230	-0.3200	0.7480
Age	0.0066	0.5700	0.5670	0.0342	13.8300	0.0000	-0.0276	-1.8000	0.0730
Age Square	-0.0001	-0.4100	0.6780	-0.0004	-13.8100	0.0000	0.0003	1.9300	0.0530
Non-white = 1	0.0134	0.2000	0.8390	-0.0703	-2.7100	0.0070	0.0836	0.9200	0.3570
Highest Qualification = GCSE	0.0036	0.0600	0.9550	0.1350	11.9600	0.0000	-0.1314	-1.5400	0.1240
Highest Qualification = A-Level	-0.0418	-0.5600	0.5760	0.1676	12.3600	0.0000	-0.2095	-2.1100	0.0350
Highest Qualification = Degree	0.2193	1.8500	0.0650	0.2648	11.6800	0.0000	-0.0455	-0.2900	0.7740
Qualification in Nursing	0.1417	1.2800	0.2010	0.0907	2.5200	0.0120	0.0510	0.3400	0.7340
Tenure in Current Job	0.0207	4.1900	0.0000	0.0160	8.8100	0.0000	0.0047	0.6900	0.4890
Tenure Square	-0.0005	-3.1600	0.0020	-0.0002	-2.5800	0.0100	-0.0003	-1.4900	0.1350
Usually Work During Evening	-0.0285	-0.7500	0.4510	-0.0523	-4.3100	0.0000	0.0237	0.4600	0.6440
Usually Work During Night	-0.0308	-0.9600	0.3390	-0.1080	-6.0300	0.0000	0.0771	1.6800	0.0930
Length of Week (1 – 7)	0.0000	0.0000	0.9970	-0.0135	-3.3000	0.0010	0.0135	0.8900	0.3760
Supervisor =1	0.0705	2.1800	0.0300	0.0061	0.4200	0.6770	0.0644	1.4300	0.1520
Manager = 1	0.1006	2.3300	0.0200	0.2295	15.6300	0.0000	-0.1289	-2.1900	0.0280
Work capacity limited by illness	-0.0596	-1.1900	0.2360	-0.0822	-4.7200	0.0000	0.0226	0.3300	0.7410
Job is Permanent = 1	-0.1088	-1.7600	0.0790	0.0548	2.3500	0.0190	-0.1636	-1.9300	0.0540
Job is Full-Time = 1	-0.0247	-0.7900	0.4310	0.1701	15.1400	0.0000	-0.1948	-4.5500	0.0000
NHS Nurse Dummy	-	-	-	-	-	-	1.1211	2.0900	0.0360
Constant	1.8379	4.5800	0.0000	1.0623	13.7900	0.0000	1.0623	13.9800	0.0000
	Number of obs = 709 F(114, 594) = 3.56 Prob > F = 0.0000 R-squared = 0.4062 Adj R-squared = 0.2923 Root MSE = .32107			Number of obs = 9156 F(117, 9038) = 31.80 Prob > F = 0.0000 R-squared = 0.2916 Adj R-squared = 0.2825 Root MSE = .42934			Number of obs = 9865 F(232, 9632) = 20.92 Prob > F = 0.0000 R-squared = 0.3350 Adj R-squared = 0.3190 Root MSE = .42346		

Table 3. Summary Statistics of the Vacancy Data for NHS Nurses

	Mean	SD	Min	Max
Estimated coefficient of health authority dummies in Estimation [3] (D_i)	-0.1338	0.1670	-0.5588	0.3416
Number of vacancies	102.6	115.7	0	590
Vacancies as percentage of nurses employed in health authorities	0.0351	0.0282	0	0.1330
Ln of vacancy percentages	-3.8074	1.2659	-11.5129	-2.0174

Table 4. Results of the Vacancy Estimation

	Coeff.	t	P>|t|
Estimated coefficient of health authority dummies in Estimation [3] (D_i)	-1.6772	-2.8500	0.0050
Constant	-3.9553	-31.3800	0.0000
	Number of obs = 98 F(1, 96) = 8.28 Prob > F = 0.0050 R-squared = 0.0794 Adj R-squared = 0.0698 Root MSE = 1.2209		